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IS 9000-16 (1983): Basic environmental testing procedures for electronic and electrical items 16 Driving rain test [LITD 1: Environmental Testing Procedure]



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“Knowledge is such a treasure which cannot be stolen”

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IS : 9000 (Part XVI) - 1983

Indian Standard

**BASIC ENVIRONMENTAL TESTING
PROCEDURES FOR ELECTRONIC AND
ELECTRICAL ITEMS**

PART XVI DRIVING RAIN TEST

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NEW DELHI 110002

Indian Standard

BASIC ENVIRONMENTAL TESTING PROCEDURES FOR ELECTRONIC AND ELECTRICAL ITEMS

PART XVI DRIVING RAIN TEST

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Indian Standard

BASIC ENVIRONMENTAL TESTING PROCEDURES FOR ELECTRONIC AND ELECTRICAL ITEMS

PART XVI DRIVING RAIN TEST

0. FOREWORD

0.1 This Indian Standard (Part XVI) was adopted by the Indian Standards Institution on 17 February 1983, after the draft finalized by the Environmental Testing Procedures Sectional Committee had been approved by the Electronics and Telecommunication Division Council.

0.2 The differences in environmental testing procedures for component type items and equipment type items are fast disappearing in the context of technological developments. It is, therefore, felt necessary to have uniform testing procedures wherever possible. This series of standards on environmental testing procedures (IS : 9000) has been prepared with this objective. This is also in line with the principle adopted by IEC/TC 50 'Environmental testing' in developing unified series of standards on environmental testing procedures by the International Electrotechnical Commission.

0.2.1 It is proposed to withdraw the existing Indian Standards, namely, IS : 589-1961* and IS : 2106† series dealing with environmental tests for electronic components and equipment respectively, as soon as the tests mentioned therein are covered in the new series (IS : 9000).

0.3 While preparing this standard, assistance is derived from JSS 55555-1977 Environmental test methods for electronic and electrical equipment. Directorate of Standardization, Ministry of Defence, India.

0.4 In reporting the result of a test made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS : 2-1960‡.

*Basic climatic and mechanical durability tests for components for electronic and electrical equipment (*revised*).

†Environmental tests for electronic and electrical equipment.

‡Rules for rounding off numerical values (*revised*).

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1. SCOPE

1.1 This standard (Part XVI) deals with the procedure for application of rain test on electronic and electrical items as a part of the basic environmental testing procedures.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions and explanation of terms given in IS : 9000 (Part I)-1977* shall apply.

3. OBJECT

3.1 The object of this test is to determine the suitability of electronic and electrical items for use under conditions of rain.

4. TEST CHAMBER

4.1 A driving rain chamber meeting requirements of **4.2** to **4.4** shall be used for this test.

4.2 The driving rain chamber shall be capable of spraying water under laboratory atmospheric conditions at a static pressure of $200 \text{ kPa} \pm 15$ percent from 8 shower heads.

NOTE 1 — The static pressure shall be measured nearest to each shower head.

NOTE 2 — The water used for this test may be recirculated.

4.3 It shall be possible to direct the spray from 4 of these shower heads downwards, at an angle of 45° , at each of the four uppermost corners of the item under test and from the remaining 4 shower heads, horizontally at the centre of the area of each of the four sides of the item. It shall also be possible to locate the shower heads at a distance of 0.50 m to 0.75 m from the corners of sides of the item.

4.4 The dimensions of shower head shall be as given in Fig. 1. Use of such shower head will result in water consumption of approximately 450 litre/hour at a static pressure of 200 kPa.

5. PRECONDITIONING

5.1 The relevant specification may call for preconditioning.

6. INITIAL MEASUREMENTS

6.1 The item shall be visually inspected and electrically and mechanically checked, as required by the relevant specification.

*Basic environmental testing procedures for electronic and electrical items : Part I General.

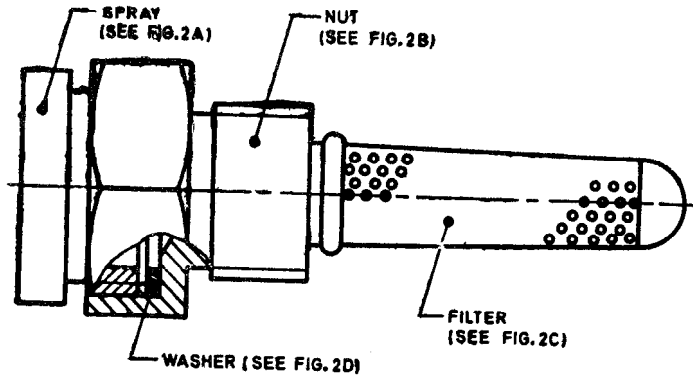
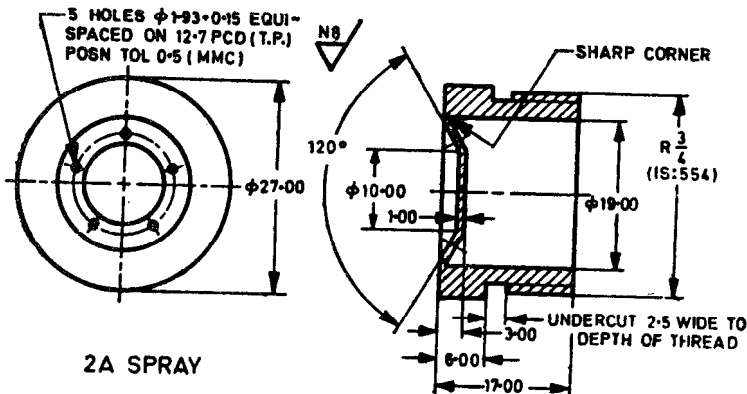


FIG. 1 SHOWER HEAD ASSEMBLY



2A SPRAY

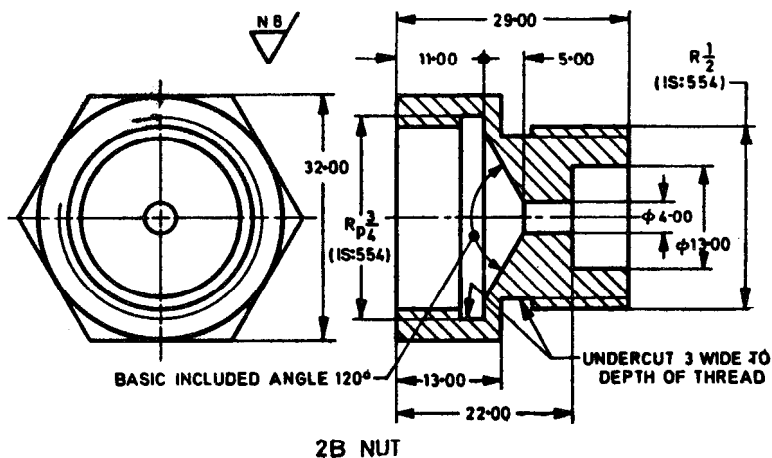
NOTE 1 — Material brass.

NOTE 2 — Tolerances ± 0.15 unless stated otherwise.

NOTE 3 — All burrs to be removed. External edges to be radiused or chamfered 0.25 Min. Internal corners to be radiused or chamfered 0.5 Max.

All dimensions in millimetres.

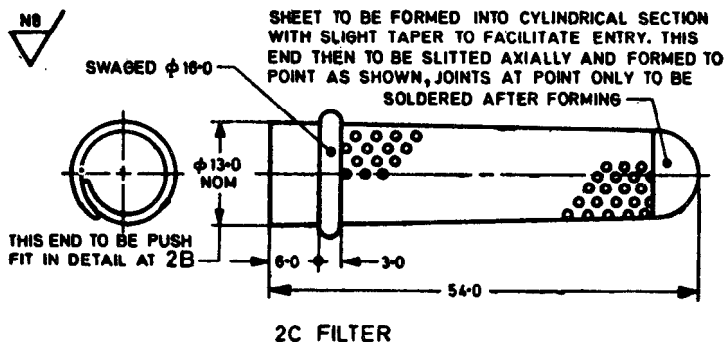
FIG. 2 DETAIL OF SHOWER HEAD PARTS — Continued



NOTE 1 — Material brass.

NOTE 2 — Tolerances ± 0.15 , unless stated otherwise.

NOTE 3 — All burrs to be removed. External edges to be radiused or chamfered 0.25 Min. Internal corners to be radiused or chamfered 0.5 Max.



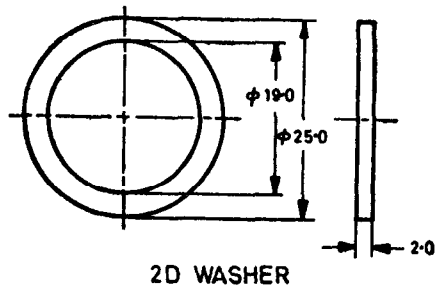
NOTE 1 — Material 1 mm cold rolled brass sheet perforated 0.8 dia holes on staggered pitches 1.5 approx.

NOTE 2 — Tolerances ± 0.4 , unless stated otherwise.

NOTE 3 — All burrs to be removed. External edges to be radiused or chamfered 0.25 Min. Internal corners to be radiused or chamfered 0.5 Max.

All dimensions in millimetres.

FIG. 2 DETAIL OF SHOWER HEAD PARTS — *Continued*



NOTE 1 — Material leather.

NOTE 2 — Tolerances ± 0.4 , unless stated otherwise.

All dimensions in millimetres.

FIG. 2 DETAIL OF SHOWER HEAD PARTS

7. CONDITIONING

7.1 The item shall be subjected to this test, in its 'unpacked' and 'switched-off' condition. Three test conditions are specified for this test. The item shall be subjected to one of the test conditions as specified in **7.1.3**.

7.1.1 The item under test, while being under the laboratory conditions shall be suitably positioned inside the chamber in its normal operational attitude as specified.

7.1.2 Tap water at laboratory temperature and at a static pressure of 200 kPa ± 15 percent shall be sprayed for 1 hour or any other period as specified in the relevant specification. The consumption of water from each shower head shall be 450 litres ± 10 percent per hour.

7.1.3 Spray from the shower heads shall be directed as given in one of the three test conditions given below:

- a) *Test condition A* — Spray from four shower heads shall be directed at an angle of 45° at each of the four uppermost corners of the item.

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- b) *Test condition B* — Spray from four shower heads shall be directed horizontally at the centre of each of the four sides of the equipment.
- c) *Test condition C* — The item shall be sprayed from eight shower heads, four of them being directed at an angle of 45° on each of the uppermost corners of the item and the remaining four being directed horizontally at the centre of the area of each of the four sides of the item.

7.1.4 At the conclusion of the period specified, the item shall be removed from the chamber and, if required by the relevant specification, a performance check shall be carried out.

8. RECOVERY

8.1 Unless otherwise specified, the external surfaces of the item shall be dried by wiping or by applying a blast of air at room temperature.

9. FINAL MEASUREMENTS

9.1 The item shall be examined for undue penetration of water; and shall be visually inspected and electrically and mechanically checked, as required by the relevant specification.

10. INFORMATION TO BE GIVEN IN THE RELEVANT SPECIFICATION

10.1 When this test is included in the relevant specification, the following details shall be given as far as they are applicable:

	<i>Clause Ref</i>
a) Preconditioning, if any	5
b) Initial measurements	6
c) Distance between shower head and test item during conditioning	7.1.1
d) Duration of spray, if other than 1 h	7.1.2
e) Applicable test conditions	7.1.3
f) Details of performance check, if required	7.1.4
g) Final measurements	9
h) Permissible limits of water penetration	9.1
j) Any deviation from the normal test procedure	—